

DATA SHEET

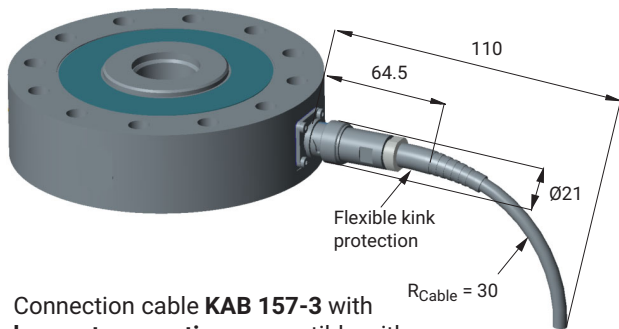
U10M Force Transducer

SPECIAL FEATURES

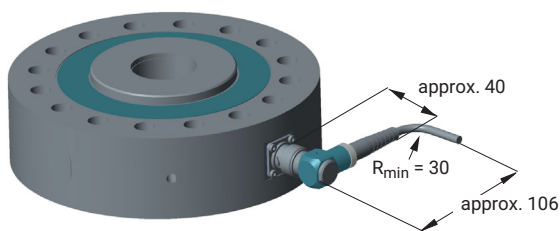
- Precise and robust tensile/compressive force transducer for static and dynamic measurement tasks
- High lateral force and bending moment stability, the effect of the bending moment is electrically compensated
- For forces up to 2.5 MN
- The numerous possible configurations (TEDS, double bridge, various electrical connections, etc.), mean that it can be flexibly adapted to many measurement tasks
- Made of rust-resistant materials, degree of protection IP68 on request
- High fundamental frequency - ideal for measuring fast processes



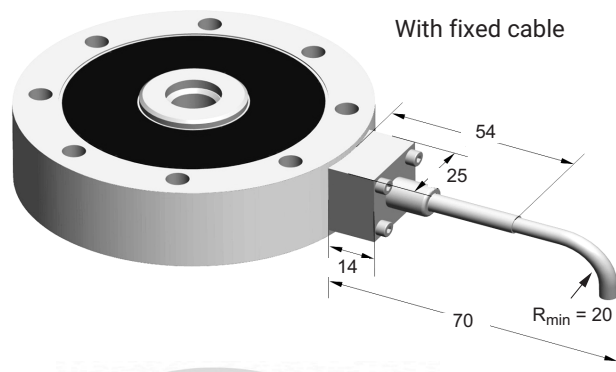
MOUNTING DIMENSIONS OF THE CONNECTION VARIANTS



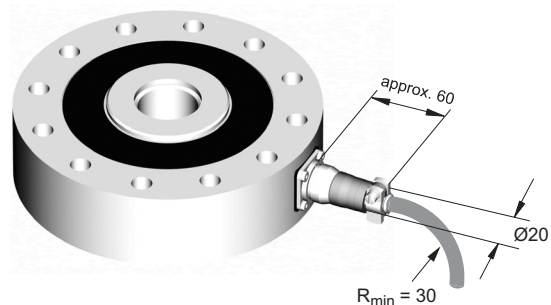
Connection cable **KAB 157-3** with **bayonet connection**, compatible with a MIL-C-26482 series 1 connector



Configurable connection cable **K-CAB-F** with angled bayonet connector option, compatible with a MIL-C-26482 series 1 connector



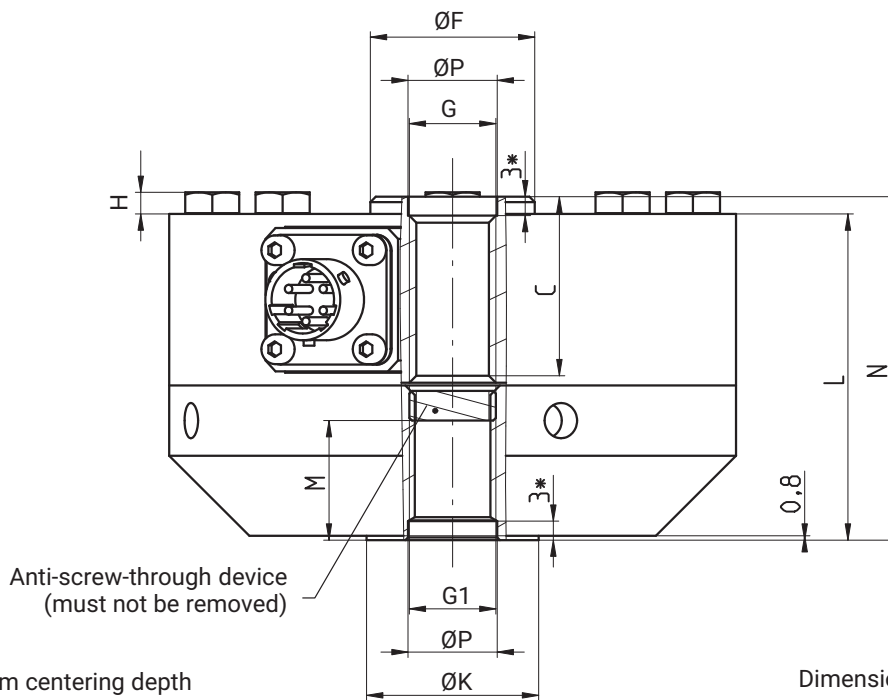
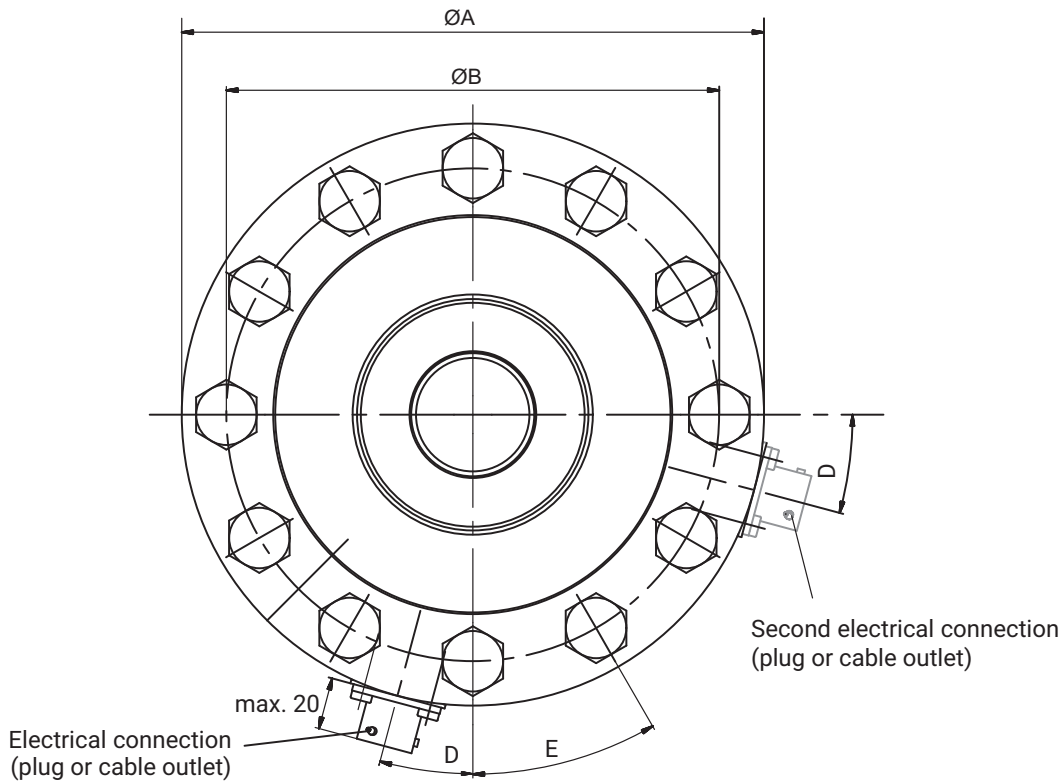
With fixed cable



Connection cable **KAB158** with screw connection, compatible with a MIL-C-26482 series 1 connector

Dimensions in mm (1 mm = 0.03937 inches)

DIMENSIONS OF U10M WITH FOOT ADAPTER



^{*)}maximum centering depth

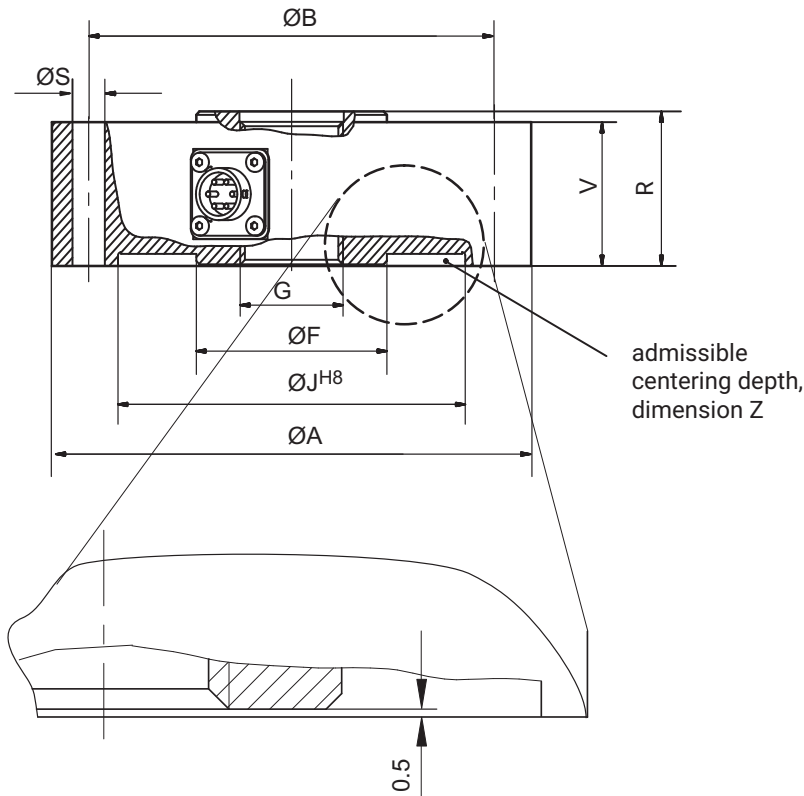
Dimensions in mm; 1 mm = 0.03937 inch

Nominal (rated) force	Dimensions in	ØA	ØB	C	D	E	ØF	G	H	M
1.25 kN - 5 kN	mm	104.8	88.9	33.3	22.5°	45°	30.4	M16x2-4H	4	22
	inch	4.13	3.5	1.3			1.2			
12.5 kN - 25 kN	mm	104.8	88.9	33.3	22.5°	45°	31.5	M16x2-4H	4	22
	inch	4.13	3.5	1.3			1.24			
50 kN	mm	153.9	130.3	42.9	15°	30°	61.2	M33x2-4H	10	35.5
	inch	6.06	5.13	1.69			2.41			

Nominal (rated) force	Dimensions in	ØA	ØB	C	D	E	ØF	G	H	M
125 kN	mm	153.9	130.3	42.9	15°	30°	67.3	M33x2-4H	10	35.5
	inch	6.06	5.13	1.69			2.65		0.39	1.4
250 kN	mm	203.2	165.1	61.9	11.25°	22.5°	95.5	M42x2-4H	12	44
	inch	8.00	6.51	2.4			3.76		0.47	1.73
500 kN	mm	279	229	87.3	11.25°	22.5°	122.2	M72x2-4H	16	69.5
	inch	10.98	9.02	3.4			4.81		0.63	2.73
1.25 MN	mm	390	322	125	7.5°	15°	190	M120x4-4H	22	112
	inch	15.35	12.68	4.92			7.48		0.87	4.41

Nominal (rated) force	Dimensions in	G1	ØK	L	N	ØPH8
1.25 kN - 25 kN	mm	M16x2-4H	31.8	60.3	63.5	16.5
	inch		1.25	2.37	2.5	0.65
50 kN - 125 kN	mm	M33x2-4H	57.2	85.9	89	33.5
	inch		2.25	3.38	3.5	1.32
250 kN	mm	M42x2-4H	76.2	108	114.3	43
	inch		3	4.25	4.5	1.69
500 kN	mm	M72x2-4H	114	152.4	165.1	73
	inch		4.49	6	6.5	2.87
1.25 MN	mm	M120x4-4H	190	239	254	123
	inch		7.48	9.41	10.0	4.84

DIMENSIONS OF U10M WITHOUT FOOT ADAPTER

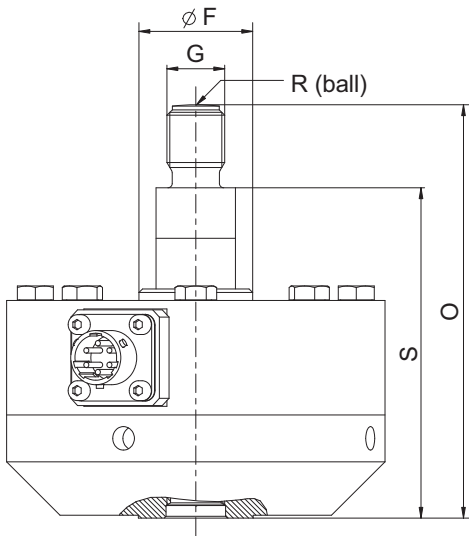


Dimensions in mm; 1 mm = 0.03937 inch

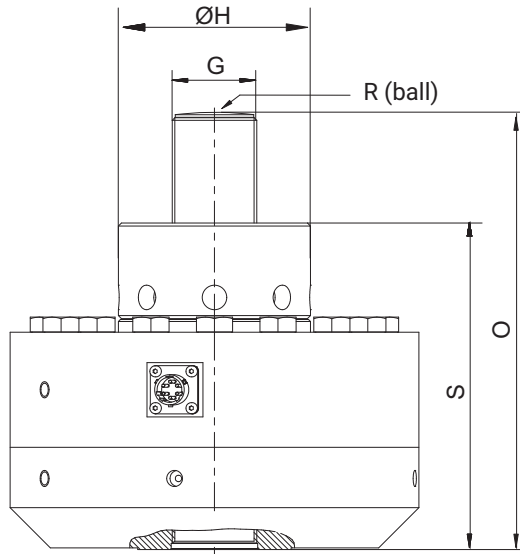
Nominal (rated) force	Dimensions in	ØA	ØB	ØS	ØF	G	ØJH8	V	R	Z
1.25 kN - 5 kN	mm	104.8	88.9	7.0	30.4	M16x2-4H	78	31.7	34.9	2.5
	inch	4.13	3.5	0.27	1.2		3.07	1.25	1.37	0.1
12.5 kN - 25 kN	mm	104.8	88.9	7.0	31.5	M16x2-4H	78	31.7	34.9	2.5
	inch	4.13	3.5	0.27	1.24		3.07	1.25	1.37	0.1
50 kN	mm	153.9	130.3	10.5	61.2	M33x2-4H	111.5	41.4	44.5	2.5
	inch	6.06	5.13	0.41	2.41		4.39	1.63	1.75	0.1
125 kN	mm	153.9	130.3	10.5	67.3	M33x2-4H	111.5	41.4	44.5	2.5
	inch	6.06	5.13	0.41	2.65		4.39	1.63	1.75	0.1
250 kN	mm	203.2	165.1	13.5	95.5	M42x2-4H	143	57.2	63.5	3.5
	inch	8.00	6.51	0.53	3.76		5.63	2.25	2.5	0.14
500 kN	mm	279	229	17.0	122.2	M72x2-4H	175	76.2	88.9	6
	inch	10.98	9.02	0.66	4.81		6.89	3	3.5	0.24
1.25 MN	mm	390	322	23	190	M120x4-4H	262	112	127	6
	inch	15.35	12.68	0.91	7.48		10.31	4.41	5.08	0.24

DIMENSIONS OF U10M WITH FORCE APPLICATION AND FOOT ADAPTER

1.25 kN ... 25 kN



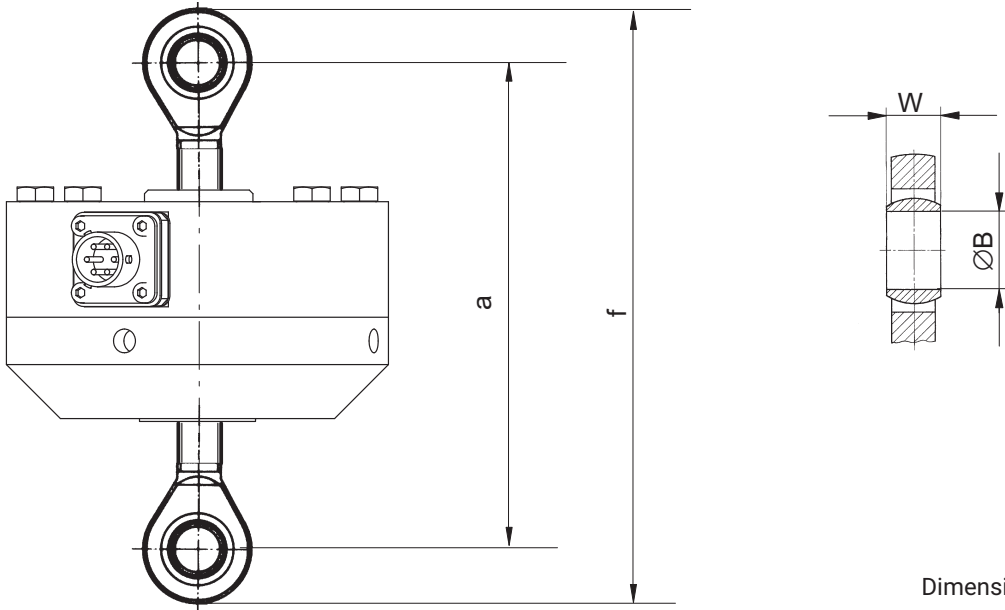
50 kN ... 1.25 MN



Dimensions in mm; 1 mm = 0.03937 inch

Nominal (rated) force	Dimensions in	ØF	G	ØH	S	O	R
1.25 kN - 5 kN	mm	30.4	M16x2	-	91.5	114.5	60
	inch	1.2			3.6		
12.5 kN - 25 kN	mm	31.5	M16x2	-	91.5	114.5	60
	inch	1.24			3.6		
50 kN	mm	61.2	M33x2-6g	67.3	131.5	174.5	160
	inch	2.41		2.65	5.18	6.87	6.3
125 kN	mm	67.3	M33x2-6g	67.3	131.5	174.5	160
	inch	2.65		2.65	5.18	6.87	6.3
250 kN	mm	95.5	M42x2-6g	95.5	162.3	217.3	160
	inch	3.76		3.76	6.39	8.56	6.3
500 kN	mm	122.2	M72x2-6g	135	230.1	307.3	400
	inch	4.81		5.31	9.06	12.1	15.75
1.25 MN	mm	190	M120x4-6g	190	351.5	465.3	600
	inch	7.48		7.48	13.84	18.32	23.62

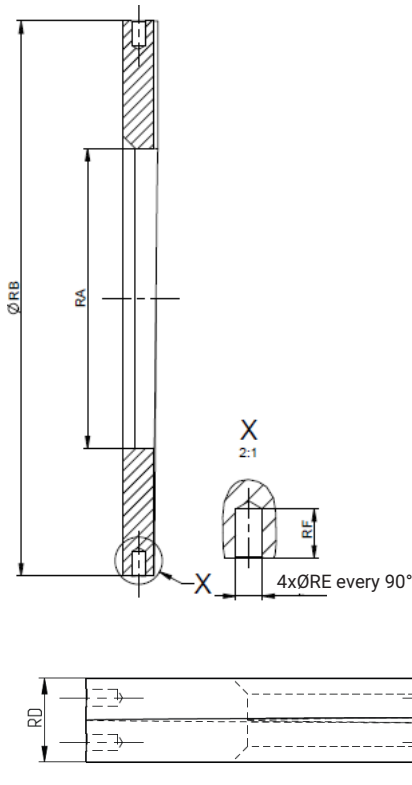
DIMENSIONS OF U10M WITH KNUCKLE EYES



Dimensions in mm; 1 mm = 0.03937 inch

Nominal (rated) force kN	Ordering number for knuckle eye	a (min. - max.)		f (min. - max.)		W		ØB	
		mm	inch	mm	inch	mm	inch	mm	inch
1.25 - 25	1-Z4/20kN/ZGUW	146.5-152.5	5.77-6.00	186.5 - 192.5	7.34 - 7.58	21	0.827	16	0.630
50 - 125	1-ZGAM33F	263.0-271.0	10.35-11.67	392.0 - 400.0	15.43 - 15.75	35	1.387	50	1.969
250	1-ZGAM42F	300.8-308.8	11.84-12.16	429.8 - 437.8	16.92 - 17.24	44	1.732	60	2.362
500	1-ZGAM72F	439.3-447.3	17.30-17.61	641.9 - 649.3	25.27 - 25.56	60	2.362	90	3.543

DIMENSIONS RAMP DISK PLS



Dimensions in mm;
1 mm = 0.03937 inch

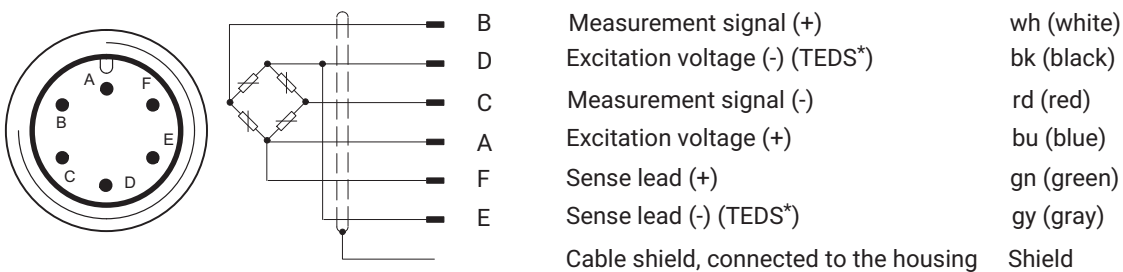
Thread diameters	Dimensions in mm				
RA	ØRB [mm]	RC [mm]	RD (min.-max.) [mm]	ØRE [mm]	RF [mm]
M16	26	4	7.5 - 8.5	1.7	3
M33	67.3	6	11 - 13	2.2	4
M42	95.5	7	13 - 15	2.7	5
M72	135	8.5	16 - 18	3.2	6
M120	190	6.35	12 - 13.4	3.2	6

Please note the information in the operating manual

PIN AND CABLE ASSIGNMENT

Device plug PIN assignment

Cable assignment



* only with selected option T (transducer identification)

SPECIFICATIONS (FOR 100% CALIBRATION)

Nominal (rated) force:	F_{nom}	kN	1.25	2.5	5	12.5	25	50	125	250	500	
		MN										
Accuracy												
Accuracy class			0.02		0.03		0.04		0.05			
Relative reproducibility and repeatability errors without rotation	b_{rg}	%	0.02									
Hysteresis error at 0.4 F_{nom}, rel. to the full scale value	$v_{0.4}$	%	0.02		0.03		0.04		0.05			
Linearity deviation	d_{lin}	%	0.02		0.025		0.035		0.05			
Rel. zero point return	v_{w0}	%	0.008									
Relative creep	$d_{cr, F+E}$	%	0.02									
Effect of the bending moment at 10% F_{nom} * 10mm	d_{Mb}	%	0.01									
Effect of lateral forces (lateral force = 10% of F_{nom})	d_Q	%	0.01									
Temperature coefficient of the rated output	TC_S	% / 10 K	0.015									
Temperature coefficient of zero signal	TC_0	% / 10 K	0.015									
Rated electrical output												
Rated output (nominal)	C_{nom}	mV/V	1				2					
Relative zero signal error	$d_{S,0}$	%	1									
Deviation of the rated output (with "adjusted rated output" option)	d_C	%	0.1									
Rated output range (without "adjusted rated output" option)	C	mV/V	1 ... 1.5				2 ... 2.5					
Tension/compression rated output variation	d_{ZD}	%	0.2									
Input resistance	R_i	Ω	>345									
Output resistance (without "adjusted rated output" option)	R_o	Ω	280 ... 360									
Output resistance (with "adjusted rated output" option)	R_o	Ω	365								280 ... 360	
Tolerance of the output resistance in the "adjusted rated output" option	d_{Ra}	%	$\pm 0.5 \Omega$								-	
Insulation resistance	R_{is}	G Ω	>2									
Operating range of the excitation voltage	$B_{U,G}$	V	0.5 ... 12									
Reference excitation voltage	U_{ref}	V	5									
Connection			6-wire circuit									

Nominal (rated) force:	F_{nom}	kN	1.25	2.5	5	12.5	25	50	125	250	500	
		MN										1.25
Temperature												
Reference temperature	T_{ref}	°C	23									
		°F	73.4									
Nominal temperature range	$B_{T,nom}$	°C	-10 ... +45									
		°F	14 ... 113									
Operating temperature range	$B_{T,G}$	°C	-30 ... +85									
		°F	-22 ... +185									
Storage temperature range	$B_{T,S}$	°C	-30 ... +85									
		°F	-22 ... +185									
Characteristic mechanical quantities												
Maximum operating force	F_G	% of F_{nom}	240									
Force limit	F_L		240									
Breaking force	F_B		>400									
Torque limit	$M_{G,max}$	N*m	30	60	125	315	635	1270	3175	5715	11430	28575
Bending moment limit	$M_{b,max}$		30	60	125	315	635	1270	3175	5715	11430	28575
Static lateral force limit	F_Q	% of F_{nom}	100									
Nominal (rated) displacement	s_{nom}	mm	0.02			0.03			0.04	0.05	0.06	0.09
Fundamental frequency	f_G	kHz	4.5	5.9	9.3	6.6	9.2	6.5	8.1	6.6	6.1	3.8
Relative permissible oscillatory stress	f_{rb}	% of F_{nom}	200									
Rigidity	c_{ax}	10^5 N/mm	0.625	1.25	2.5	4.17	8.33	16.7	31.3	50	83.3	140
General information												
Degree of protection as per EN 60529, with bayonet connector (standard version), socket connected to sensor			IP67									
Degree of protection as per EN 60529, with "threaded connector" option			IP64									
Degree of protection as per EN 60529, with "fixed cable" option			IP67				IP68 ¹⁾					
Spring element material			Aluminum				Stainless steel					
Measuring point protection			Tightly sealed measuring body				Hermetically welded measuring body					
Cable (only with "fixed cable" option)			Six-wire connection, TPE electrical insulation. Outside diameter 5.4 mm									
Cable length		m	6 or 15									
Mechanical shock resistance as per IEC 60068-2-27												
Number		n	1000									
Duration		ms	3									
Acceleration		m/s ²	1000									
Vibrational stress as per IEC 60068-2-6												
Frequency range		Hz	5 ... 65									
Duration		min	30									
Acceleration		m/s ²	150									
Weight (with adapter)	m	kg	1.2			3		10		23	60	186
		lbs	2.65			6.61		22.05		50.71	132.28	409.2
Weight (without adapter)	m	kg	0.5			1.3		5		11	28	77
		lbs	1.1			2.87		11.02		24.25	61.73	169.4

1) Test condition: 1 m water column, 100 hours

SPECIFICATIONS (FOR 200% CALIBRATION)


Nominal (rated) force:	F_{nom}	kN	1.25	2.5	5	12.5	25	50	125	250	500	
		MN										
Calibration force	F_{cal}	kN	2.5	5	10	25	50	100	250	500	1000	
		MN										2.5
Accuracy												
Accuracy class			0.02			0.03		0.04			0.05	
Relative reproducibility and repeatability errors without rotation	b_{rg}	%	0.02									
Hysteresis error at $0.4 F_{cal}$	$v_{0.4}$	%	0.02			0.03		0.04			0.05	
Linearity deviation	d_{lin}	%	0.02			0.025		0.035			0.05	
Rel. zero point return			0.01									0.02
Relative creep	$d_{cr, F+E}$	%	0.02									
Effect of the bending moment at $10\% F_{cal} * 10mm$	d_{Mb}	%	0.01									
Effect of lateral forces (lateral force = 10% of F_{cal})	d_Q	%	0.01									
Temperature coefficient of the rated output	TC_S	% / 10 K	0.015									
Temperature coefficient of zero signal	TC_0		0.0075									
Rated electrical output												
Rated output (nominal)	C_{nom}	mV/V	2				4					
Relative zero signal error	$d_{S,0}$	%	1									
Rated output range		mV/V	2 ... 3				4 ... 4.9					
Deviation of the rated output with "adjusted rated output" option	d_C	%	0.1									
Tension/compression rated output variation	d_{ZD}	%	0.2 (typ. 0.1)									
Input resistance	R_i	Ω	>345									
Output resistance (without "adjusted rated output" option)	R_o	Ω	280 ... 360									
Output resistance (with "adjusted rated output" option)	R_o	Ω	365									280 ... 360
Tolerance of the output resistance with "adjusted rated output" option	d_{Ro}	%	$\pm 0.5 \Omega$									-
Insulation resistance	R_{is}	G Ω	>2									
Operating range of the excitation voltage	$B_{U,G}$	V	0.5 ... 12									
Reference excitation voltage	U_{ref}	V	5									
Connection			6-wire circuit									
Temperature												
Reference temperature	T_{ref}	$^{\circ}C$	23									
		$^{\circ}F$	73.4									
Nominal temperature range	$B_{T,nom}$	$^{\circ}C$	-10 ... +45									
		$^{\circ}F$	14 ... 113									
Operating temperature range	$B_{T,G}$	$^{\circ}C$	-30 ... +85									
		$^{\circ}F$	-22 ... +185									

Nominal (rated) force:	F_{nom}	kN	1.25	2.5	5	12.5	25	50	125	250	500	
		MN										
Calibration force	F_{cal}	kN	2.5	5	10	25	50	100	250	500	1000	
		MN										2.5
Storage temperature range	$B_{T,S}$	°C	-30 ... +85									
		°F	-22 ... +185									
Characteristic mechanical quantities												
Maximum operating force	F_G	% of F_{nom}	240 (120% of the calibration force)									
Force limit	F_L		240 (120% of the calibration force)									
Breaking force	F_B		>400 (200% of the calibration force)									
Torque limit	$M_{G,max}$	N*m	30	60	125	315	635	1270	3175	5715	11430	28575
Bending moment limit	$M_{b,max}$		30	60	125	315	635	1270	3175	5715	11430	28575
Static lateral force limit	F_Q	% of F_{nom}	100									
Nominal (rated) displacement	s_{nom}	mm	0.02			0.03			0.04	0.05	0.06	0.09
Fundamental frequency	f_G	kHz	4.5	5.9	9.3	6.6	9.2	6.5	8.1	6.6	6.1	3.8
Relative permissible oscillatory stress	f_{rb}	% of F_{nom}	200 (100% of the calibration force)									
Rigidity	c_{ax}	10^5 N/mm	0.625	1.25	2.5	4.17	8.33	16.7	31.3	50	83.3	140
General information												
Degree of protection as per EN 60529, with bayonet connector (standard version), socket connected to sensor			IP67									
Degree of protection as per EN 60529, with "threaded connector" option			IP64									
Degree of protection as per EN 60529, with "fixed cable" option			IP67				IP68 ¹⁾					
Spring element material			Aluminum				Stainless steel					
Measuring point protection			Tightly sealed measuring body				Hermetically welded measuring body					
Cable (only with "fixed cable" option)			Six-wire connection, TPE electrical insulation. Outside diameter 5.4 mm									
Cable length	m	6 or 15										
Mechanical shock resistance as per IEC 60068-2-27												
Number	n	1000										
Duration	ms	3										
Acceleration	m/s ²	1000										
Vibrational stress as per IEC 60068-2-6												
Frequency range	Hz	5 ... 65										
Duration	min	30										
Acceleration	m/s ²	150										
Weight (with adapter)	m	kg	1.2			3		10		23	60	186
		lbs	2.65			6.61		22.05		50.71	132.28	409.2
Weight (without adapter)	m	kg	0.5			1.3		5		11	28	77
		lbs	1.1			2.87		11.02		24.25	61.73	169.4

1) Test condition: 1 m water column, 100 hours

U10M VERSIONS AND ORDERING NUMBERS

Code	Measurement range	Ordering number
1k25	1.25 kN	1-U10M/1.25kN
2k50	2.5 kN	1-U10M/2.5kN
5k00	5 kN	1-U10M/5kN
12k5	12.5 kN	1-U10M/12.5kN
25k0	25 kN	1-U10M/25kN
50k0	50 kN	1-U10M/ 50kN
125k	125 kN	1-U10M/125kN
250k	250 kN	1-U10M/250kN
500k	500 kN	1-U10M/500kN
1M25	1.25 MN	1-U10M/1.25MN

 Preferred version, available at short notice

The ordering number for the preferred types is 1-U10M..., the ordering number for customized versions is K-U10M...

No. of meas. bridges	Rated output	Calibration	Transducer identification	Mechanical design	Plug protection	El. connection Bridge A	El. connection Bridge B	Force application	Plug version for the Bridge A "fixed cable" option	Plug version for the Bridge B "fixed cable" option
Single bridge SB	Not adjusted N	100% (dyn.) 1	Without TEDS S	With adapter W	Without U	Bayonet connector B		Without O	Free ends Y	
Double bridge DB	Adjusted J	200% (stat.) 2	With TEDS T	Without adapter N	With P	Threaded connector G		With L	D-sub connector, 15-pin F	
						Fixed cable (6 m) K			HD-sub connector, 15-pin Q	
						Fixed cable (15 m) V			Plug ME3106PEMV N	
									ODU connector, 15-pin P	
									M12 cable coupling, 8-pin M	

Ordering example

K-U10M-	25k0-	DB-	N-	2-	T-	N-	U-	V-	V-	O-	M-	M
U10, 25 kN nominal (rated) force		Double bridge	Not adjusted	Calibrated at 200% of nominal (rated) force	With TEDS	Without adapter	Without plug protection	Bridge A: fixed cable, 15 m long	Bridge B: fixed cable, 15 m long	Without load application bolts	With M12 cable coupling (for connection to PAD)	With M12 cable coupling (for connection to PAD)

Number of measuring bridges	For reasons of redundancy, it is necessary in devices relevant to safety to check the plausibility of the measurement signal with a second measuring bridge (installed on the same measuring body). The signals are independently conditioned and evaluated using two separate measuring amplifiers. It is therefore also possible to connect two amplifiers with different characteristics.
Rated output	The exact rated output (nominal) is specified on the type plate. The transducer can also be adjusted to an exact rated output of 1.0 mV/V or 2.0 mV/V (if 200% calibration selected: 2 mV/V or 4 mV/V). The rel. rated output deviation is then 0.1% of the rated output (nominal). The rated output range of an unadjusted transducer lies between 1 and 1.5 or 2 and 2.5 mV/V. See Specifications for details.
Calibration	In the standard version, the transducer is designed for dynamic application up to an oscillation of $\pm 100\% F_{nom}$. For quasi-static applications, the transducer can be used up to $200\% F_{nom}$. The option is available to calibrate accordingly to $200\% F_{nom}$.
Transducer identification	Integration of TEDS (integrated electronic data sheet) as per IEEE1451.4. If the relevant amplifier electronics are provided, the measuring chain will parameterize itself.
Mechanical design	The U10 can also be ordered as a flange assembly option. This version does not include a screwed-on adapter. During installation, please observe the instructions in the Operating Manual
Plug protection	Mechanical protection through the installation of an additional square profile around the connector. Dimensions in mm approx.: WxHxB: 30x30x20
Electrical connection Bridge A	The standard version is the device plug with a bayonet connection (PT02E10-6P-compatible). The option is also available to install a screw-fitting device plug (PC02E10-6P-compatible). A third variant where the force transducers are fitted with a fixed cable is also available. In this version, all U10 achieve degree of protection IP68 with a nominal (rated) force equal to or greater than 12.5 kN.

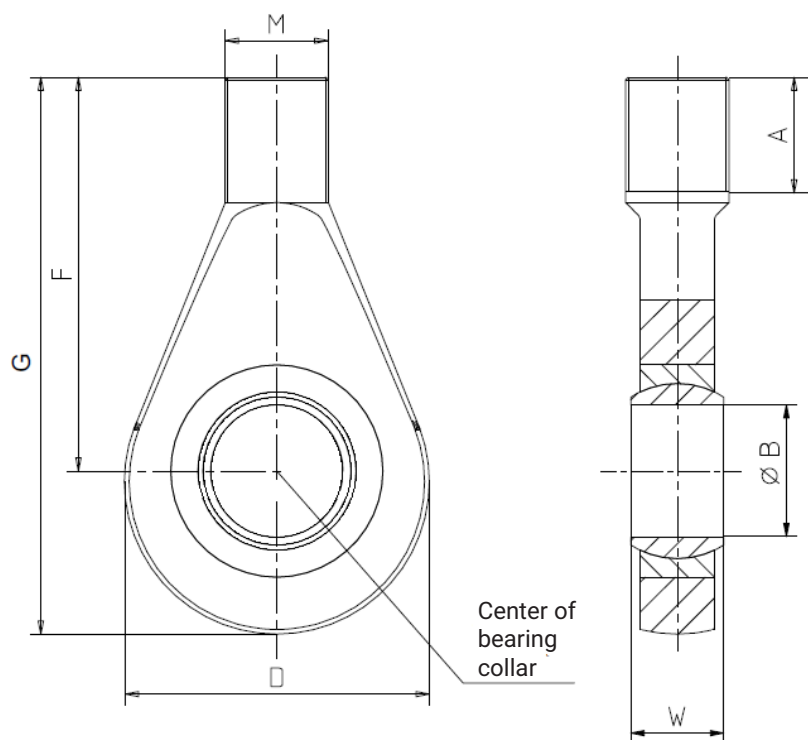
Electrical connection Bridge B	The standard version is the device plug with a bayonet connection (PT02E10-6P-compatible). The option is also available to install a screw-fitting device plug (PC02E10-6P-compatible). Both of the connection variants are often used for differentiation in the double-bridge version. A third variant where the force transducers are fitted with a fixed cable is also available. In this version, all U10 achieve degree of protection IP68 with a nominal (rated) force equal to or greater than 12.5 kN.
Force application	Mounted force application. Force application is not supplied as standard, although a force application bolt can be mounted upon request. Dimensions, see Page 4.
Plug selection for the "fixed cable" option	When ordering the U10M with a fixed cable, you can also order the connector assembly at the end of the cable, so that the force sensor can be directly connected to an amplifier. Y = free ends, no connector assembly F = D-sub connector, 15-pin, for connection to MGC+ (e.g. AP01) Scout Q = HD-sub connector, 15-pin, for connection to many HBM amplifiers of the Quantum series (MX410, Mx440, MX840) N = MS plug, for connection to HBM amplifiers such as MGC+ (Ap03) DMP or DK38 P = ODU connector, 14-pin. Degree of protection IP68. For connection to all HBM amplifiers of the Somat XR series suitable for measuring full bridge circuits. M = M12 cable coupling for connection to HBM PAD sensor-oriented electronics

ACCESSORIES (TO BE ORDERED SEPARATELY)

Cables/plugs	Ordering number
Connection cable KAB157-3; IP67 (with bayonet connection); 3 m long, TPE outer sheath; 6 x 0.25 mm ² ; free ends, shielded, outside diameter 6.5 mm	1-KAB157-3
Connection cable KAB158-3; IP54 (with screw locking); 3 m long, TPE outer sheath; 6 x 0.25 mm ² ; free ends, shielded, outside diameter 6.5 mm	1-KAB158-3
Cable, configurable with different plugs and lengths	K-CAB-F
Loose cable socket (bayonet connection)	3-3312.0382
Loose cable socket (screw locking)	3-3312.0354
Ground cable (400 mm long)	1-EEK4
Ground cable (600 mm long)	1-EEK6
Ground cable (800 mm long)	1-EEK8
Knuckle eye, M16 external thread	1-Z4/20kN/ZGUW
Knuckle eye, M33x2 external thread	1-ZGAM33F
Knuckle eye, M42x2 external thread	1-ZGAM42F
Knuckle eye, M72x2 external thread	1-ZGAM72F
Knuckle eye, M16 internal thread	1-Z4/20kN/ZGOW
Knuckle eye, M33x2 internal thread	1-ZGIM33F
Knuckle eye, M42x2 internal thread	1-ZGIM42F
Knuckle eye, M72x2 internal thread	1-ZGIM72F
Ramp disk (pre-stress disk), M16	1-PLS/M16
Ramp disk (pre-stress disk), M33	1-PLS/M33
Ramp disk (pre-stress disk), M42	1-PLS/M42
Ramp disk (pre-stress disk), M72	1-PLS/M72
Ramp disk (pre-stress disk), M120	1-PLS/M120

ACCESSORIES - KNUCKLE EYES

ZGUW / ZGAM



Dimensions in mm; 1 mm = 0.03937 inch

Nominal (rated) force	Knuckle eye ordering no.	A	ØB	D	F	G	M	W	Weight
1.25 kN - 25 kN	1-Z4/20kN/ZGUW	41.7	16 ^{+0.018}	42	67.7	88.7	M16	21	0.2 kg
50 kN - 125 kN	1-ZGAM33F	35	50 ^{-0.012}	115	118	182.5	M33x2	35	2.5 kg
250 kN	1-ZGAM42F	45	60 ^{-0.015}	126	134	202	M42x2	44	3.8 kg
500 kN	1-ZGAM72F	70	90 ^{-0.02}	190	203	305	M72x2	60	12.6 kg

Knuckle eyes are only suitable for static tensile loading.

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